

REMARKS

Claims 1-16 and 18-27 are pending in this application, claims 8-13 having been withdrawn from consideration. By this Amendment, claims 2, 3, 22 and 23 have been amended. Support for the amendments to claims 2, 3, 22 and 23 can be found in the specification as originally filed, for example, at page 3, lines 21-24; page 8, lines 16-23; page 9, line 20 - page 10, line 6; page 10, lines 9-21 and page 15, lines 13-15, and in claims 2, 3, 22 and 23 as originally filed. No new matter is added by these amendments.

Applicants appreciate the courtesies shown to Applicant's representative by Examiner Marschel in the March 2, 2005 personal interview. Applicant's separate record of the substance of the interview is incorporated into the following remarks.

I. Allowable Subject Matter

Applicants thank the Examiner for the indication that claims 1, 2, 4-7, 14-16 and 18-21 contain allowable subject matter.

II. Rejections Under 35 U.S.C. §112

The Office Action rejects claims 3 and 23 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to point out and distinctly claim the subject matter that Applicants regard as the invention. While Applicants do not necessarily agree with this rejection, Applicants respectfully submit that claims 3 and 23 have been amended herein to more clearly set forth the subject matter therein. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

III. Rejections Under 35 U.S.C. §102

The Office Action rejects claims 22-27 under 35 U.S.C. §102(e) over U.S. Patent Application Publication No. 2002/0172963 to Kelley et al. Applicants respectfully traverse this rejection.

Independent claim 22 sets forth a "production method of an electrical connection structure, the method comprising the steps of: providing a carbon nanotube as an electrode; contacting the electrode with a biopolymer by electrostatic attraction forces between the electrode and the biopolymer; and applying a voltage between the electrode and the biopolymer after the providing and contacting steps." Claims 23-27 depend, directly or indirectly from claim 22, and include all of the limitations thereof.

Kelley discloses biological sensing devices comprised of arrays of carbon nanotube electrodes, attached to a substrate, that are chemically attached to biological molecules such as DNA, and discloses methods for making such devices. *See* Kelley, Abstract; paragraphs [0008], [0010]. Chemical attachment of DNA molecules is controlled electrically. *See* Kelley, paragraph [0064]. Kelley teaches that a "critical aspect" of its invention is the attachment of at least one gold layer, either as a nanospherical particle or as a coating, to the carbon nanotubes, to serve as an anchoring surface or intermediate between the carbon nanotubes and the DNA molecules. *See* Kelley, paragraph [0011]. That is, the Kelley method attaches a gold layer to carbon nanotubes, and attaches DNA molecules electrically to the gold layer on the carbon nanotubes. Methods such as those described in Kelley are also described in the instant specification. *See* Specification, page 1, line 18 – page 2, line 20.

In contrast to Kelley, the method of claim 22 provides that the carbon nanotube electrodes contact biopolymers such as DNA by electrostatic attraction forces. That is, electrostatic attraction forces between biopolymers and the electrodes cause the biopolymers to contact with carbon nanotubes and form an electrical connection, without the use of an intermediate gold or other layer. Kelley does not disclose contacting carbon nanotubes with biomolecules by electrostatic attraction to form electrical connections. Rather, Kelley requires the use of an intermediate gold layer to anchor the connection. *See* Kelley, paragraph [0011].

As discussed in the specification, contact of carbon nanotube electrodes with biopolymers by electrostatic attraction forces, as in claim 22, allows the formation of stable electrical connections between the carbon nanotube electrodes and biopolymers. *See* Specification, page 7, lines 17-19; page 8, lines 9-15; page 9, lines 13-18; page 10, lines 9-21. However, when biopolymers are contacted with metals, such stable electrical connections cannot be expected, due to the effects of oxide films on the metal surfaces. *See* Specification, page 2, lines 15-20; page 8, lines 21-23. That is, very stable contacts, caused by electrostatic attraction forces between carbon nanotubes and biomolecules, can be formed, but such strong contacts cannot be formed between biomolecules and metals due to the presence of oxides on the metal surfaces. *See* page 9, line 13 – page 10, line 8. Thus, Kelley, which requires the presence of an intermediate gold layer between its carbon nanotubes and DNA molecules, does not teach connections between carbon nanotubes and biopolymers caused by electrostatic attraction forces, or the benefits that can be obtained therefrom.


For at least these reasons, Applicants respectfully submit that claims 22-27 are patentable over Kelley. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

IV. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-16 and 18-27 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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